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kie's plan as outlined in his book, yet the book will probably do good in directing the attention of teachers and students into better lines of work.

Twenty-five pages at the beginning of the book are devoted to the examination of the morning glory, and it is not too much to say that any student who will carefully go through the work indicated here will have a better knowledge of the structure of a flowering plant than could be acquired by the "analysis and classification" of a dozen or more plants in the old way.

The last fifty pages constitute the guide to the examination and description of plants. Here again the student's attention is directed to finding out what the *structure* of the plant is, and little or nothing is said about the matter of determining the plant's place in any system of classification.

With the part of the book intended for the general reader we have strictly nothing to do in this article; however, it may not be out of place to say that the author has presented in plain and non-technical English the principal facts as to the structure of the flowering and flowerless plants. Some errors of statement mar the pages here and there, due, doubtless, to hasty writing. Thus "All dicotyledonous plants have *open* bundles" requires modification; so, too, the statement that the ducts in the rattan cane afford a "free passage-way for the sap;" and that the large intercellular spaces of aquatic plants are "for economizing material." —*C. E. Bessey.*

BOTANICAL NOTES.—A. P. Morgan continues in the Journal of the Cincinnati Society of Natural History his Mycologic flora of the Miami valley, giving descriptions of sixty-six more species of Agaricus belonging to the sections Hyporhodii, Dermini, Pratelli, and Coprinarii. This paper brings the number of species of Agaricus up to one hundred and forty-six.——J. C. Arthur's paper "Some Algæ of Minnesota supposed to be Poisonous," from the bulletin of the Minn. Acad. Nat. Sci., Vol. XI, possesses unusual interest. Certain Nostocaceous algæ appear from the evidence to have caused the death of many domestic animals which drank of the waters of the lake at Waterville. The particular species which seems to have proved fatal is the *Rivularia fluitans* of Cohn. It occurs as little gelatinous balls "of the size of a turnip seed," studded with innumerable little points, giving them a bur-like appearance. They were afterwards found in small quantities in Lake Phalen, from which the water supply for the city of St. Paul is obtained. In the words of the author, "This discovery lends great additional interest to the real character of the Waterville plant."

ENTOMOLOGY.[1]

CAPRIFICATION.—We referred in the June number to interesting articles from Westwood and S. S. Saunders on the fig caprificators. The manner in which caprification or fertilization of the cultivated fig is effected through these insects has often been dwelt upon, and was discussed by the earliest writers. Three important works have recently been published on the subject, one by Solms-Laubach, one by Fritz Müller, and one by G. Arcangeli. Solms' work[1] is the most exhaustive, and to give some idea of the way in which the female flowers of the fig are fertilized by the male flowers of the caprifig, we quote the following from a notice of the work in *Nature:*

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[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., may be sent.

"With regard to caprification, it was known to the ancients that an insect inhabits the fruit of the caprifig, and they also discovered that the visits of this insect to the fruit of the fig exercised some beneficial influence, either in accelerating ripening or in hindering the fall of the fruit before it was ripe. Consequently branches of the caprifig were hung on the fig trees at a certain season to insure these visits, and effect what was termed caprification. The insect that operates in this manner is a small hymenopter (*Blastophaga grossorum* Grav. syn. *Cynips psenes* Linn.), the complete annual cycle of development of which takes place within the three crops of fruit of the caprifig, whilst only one generation visits the fig, and that, as will be seen, to no advantage to the insect itself. In order to render what follows easily understood, we will give the present Neapolitan names of the three crops of the caprifig. The fruits that hang through the winter and ripen in April are called *mamme* (*cratitires* of the ancients). These are followed by the *profichi* (*orni*), which ripen in June, and the *mammoni* (*fornites*), which ripen in August and September. If we closely examine the profichi when fully ripe in June, we see here and there a black-winged insect emerging from the orifice at the top, its hairy body dusted over with pollen grains that have adhered to it in its passage through the zone of male flowers. And if we cut open one of these fruits we find a considerable number of these insects, all striving to find the way out. These are females, and associated with them are some helpless, wingless males, and very often a slender ichneumon as well. The female of this generation visits not only the *mammoni*, but also the fruits of the fig, if there are any at hand, in order to deposit her eggs. Now, the remarkable fact in connection with this is that she is able to do so effectually in the *mammoni*, but not in the edible fig, though she succeeds in penetrating the fruit far enough to convey pollen to the female flowers, perishing in the act. Furthermore, the insect that develops in the *mammoni* deposits eggs in the *mamme*, and the generation proceeding therefrom finds an asylum for its progeny in the profichi. Respecting the reproduction of the Blastophaga, Graf Solms claims to have made the important discovery that the eggs must be deposited within the integuments of the ovule itself; otherwise they do not develop. The fertility of the insect is astonishing, a very few of them being able to pierce the numerous female flowers of a fruit of the caprifig. For this purpose the ovipositor is thrust between the branches of the stigma, down the pollen channel of the style into the ovary, and into the solitary ovule itself. This act causes a gall formation, whilst it does not prevent the development of the ovule into an imperfect seed, which shelters and nourishes the larva that escapes from the egg."

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[1] Die Herkunft, Domestication und Verbreitung des Gewöhnlicher Feigenbaums (*Ficus carica L.*) Von Grafen zu Solms-Laubach. Göttingen, 1882.

MIGRATIONS OF GALL-MAKING PLANT-LICE. — G. V. Horvath (*Revue d'Entomologie*, T. II, 1883, pp. 64–7) has observed that *Pemphigus zeæ-maidis* Duf., which inhabits the roots of maize, flies in autumn to adjoining elm trees, and in time produces the winter egg, from which the following spring some gall-making form hatches. Lichtenstein concludes that this must be *Pemphigus pallidus* Hallid., which F. Low has shown to be synonymous with *Tetraneura alba* Ratzb. The connection of the two insects yet lacks proof, and seems improbable.

SAMIA CYNTHIA FEEDING ON THE SASSAFRAS AND TULIP TREE.[1] —Until 1882 the larvæ of *Samia cynthia* have, so far as I know, never been found feeding on any plant or tree but the ailanthus tree. Professor C. V. Riley, in one of his entomological reports, mentions feeding them on plum; but these larvæ were probably placed on plum, and had no choice of food.

Towards the end of the summer of 1882 I found eggs of *Samia cynthia* on three sassafras trees in the suburbs of Washington. They had been laid on the sassafras in preference to ailanthus trees, several of which are growing about 150 yards off. The larvæ from these eggs grew rapidly on the sassafras leaves, and attained their full growth and spun cocoons before most of those which fed on ailanthus. Up to this time all appeared to have gone well with them; but when, in December, the cocoons were collected, I found, on cutting them open, that not one contained a live chrysalis, and that the majority of the larvæ had died before turning to the pupa state. There were about 150 cocoons cut open with the above result.

I found also that seventeen Cynthia cocoons, which I collected from tulip trees, were in the same condition. No sign of insect enemies appeared. The larvæ seemed to have shriveled up.—*H. H. Birney.*

LICHTENSTEIN'S NOMENCLATURE OF THE VARIOUS PHASES PRESENTED IN THE LIFE-HISTORY OF THE APHIDIDÆ.—While the *Entomologists' Monthly Magazine* (March, 1882, p. 224) thinks proper to publish a translation of my introduction to Adler's "Cynipidæ," the AMERICAN NATURALIST considers my attempt to explain the biology of the Cynipidæ as a very amusing illustration of the insufficient and misleading nature of my theory regarding the evolution of the Aphididæ. Really, as the French poet says,

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[1] Abstract of a paper read before the Biological Society of Washington, April 27.

> * * * Je n'avais mérité
> ni cet espèce d'honneur, ni cette indignité, * * *

and as I consider the judgment of the entomologists of the new world of great value, I trust friend Riley will allow me a few words of explanation.

First of all, as I was already called in the French Academy at Paris "*Le Romancier du Phylloxera*," because I had described the curious migrations of *Phylloxera quercus* from one kind of oak to another, I do not take the word "amusing" in its bad sense; on the contrary, for the first quality in a novel writer is to amuse his readers, and the second to be exact and truthful in his observations.

Now, if I like to call winged females (?) (curious females laying eggs or young ones without males) *larvæ* and the eggs giving birth to perfect imagos *pupæ*, whom do I harm? In the first lines of my work, explaining my theory, I take care to say that I call *larvæ* all stages of an insect preceding the imago, and *pupa* the last envelope out of which issues the sexual imago.

With this understanding I have described the evolution of many plant-lice, and established a theory which, of course, meets with exceptions; but exceptions prove the rule, and one of the best observers of plant-lice, Dr. Kessler, of Cassel, concludes his interesting studies on the elm gall-louse with the words: "Es wird der Bestätigung der Lichtensteinschen Theorie über die Entwickelung der Aphiden immer näher getreten."

So let us lay aside the discussion of mere words and not lose time in deciding whether I would have done better to have called, as Riley does, all winged forms *females* instead of *Pseudogynæ*, and all eggs *eggs* instead of *gemmations* and *pupæ*, reserving the word *egg* for the product of the true sexual female. *Larva*, which means *a mask* in Greek, is a word applicable to all forms occulting an imago, and even good authors in America in their lectures (see Riley in No. 5 of the Saturday lectures of the Biological and Philosophical Societies of Washington, April, 1882) speak of very curious higher animals (Axolotl and Amblystoma) reproducing in larval form, which is precisely the phenomenon on which I insist in my theory of the evolution of plant-lice and Cynipidæ.

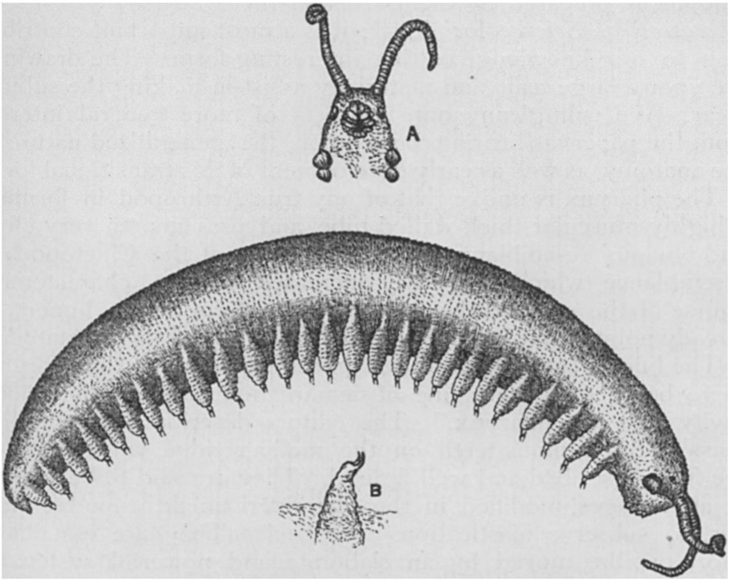
I endeavor to explain by common illustrations my conception of the biological evolution of the Aphididæ in the same way as Baron von Gleicher, De Geer, and Götze, viz: that the easiest way to understand the wonderful metamorphoses of plant-lice is to compare them to plants.

"Es ist also hier nicht anders zu schliessen als dass die Fortpflanzung dieser Insekten bloss durch ein pflanzenmässige Ausprossen in ihrem Leibe, und gleichsam durch Ableger geschehen muss" (von Gleichen 1770).—*J. Lichtenstein, Montpellier, France.*

[We gladly make room for this communication from our esteemed friend without further argument at present. The letter has been in hand for some time, and its publication delayed by an oversight.]

ZOÖLOGY.

Note on a Peripatus from the Isthmus of Panama.—The only specimen of this interesting genus which, so far as we are aware, has ever been found in North America, was discovered by Mr. John McNiel, who collected one specimen at a station on the Panama railroad. This specimen is in the museum of the Peabody Academy of Sciences, Salem, Mass. I noticed very briefly the occurrence of this species in the annual report of the Peabody Academy published in April, 1869, and referred it, though with hesitation, to *Peripatus edwardsii* Blanchard. Grube's specimens came from Venezuela. The late Professor James Orton collected a single specimen from the banks of the River Napo, which I also referred in the above-mentioned note to *P. edwardsii*. Afterwards in our "Zoölogy" we referred to this specimen as follows: "Either *P. edwardsii* Blanchard, or an undescribed species about four centimeters in length (with twenty-seven pairs of legs), inhabits the Isthmus of Panama." Where the Orton specimen now is I do not know.



The accompanying drawing represents the Panama specimen; it was made by Mr. Emerton, and well represents the alcoholic